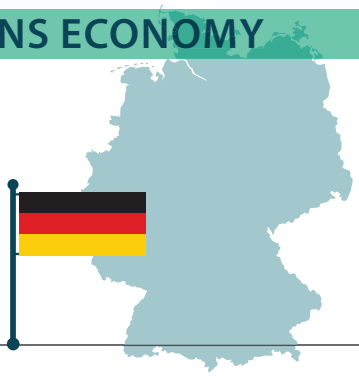
Climate Transparency

# BROWN TO GREEN: THE G20 TRANSITION TOWARDS A NET-ZERO EMISSIONS ECONOMY 2019

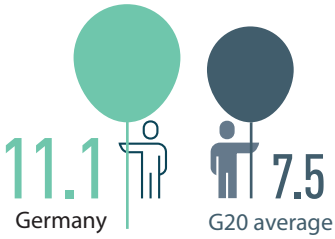
# GERMANY



## Germany's greenhouse gas (GHG) emissions are – per capita – well above G20 average.

Total GHG emissions (excl. land use emissions) have hardly decreased over the last decade.

**Greenhouse gas (GHG) emissions (incl. land use) per capita**[1]
($tCO_2e$/capita)



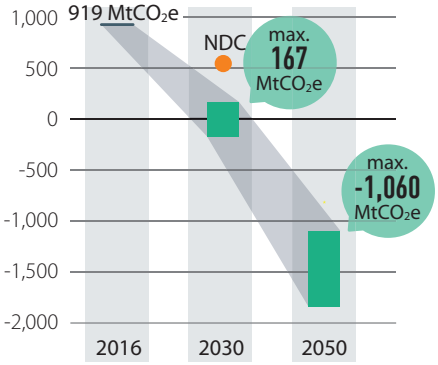

*Data for 2016*
*Source: CAT 2019; PRIMAP 2018; World Bank 2019*

**Trend** (2011-2016) -5% -1%

## Germany is not on track for a 1.5°C world.

Germany's fair share range is below 167 $MtCO_2e$ by 2030 and below -1,060 $MtCO_2e$ by 2050. Germany's national target is to reduce emissions 55% below 1990 by 2030, equivalent to 543-562 $MtCO_2e$ by 2030, and to net zero by 2050. 1.5°C-compatibility can be achieved via strong domestic emissions reductions, supplemented with contributions to global emissions reduction efforts. All figures exclude land use emissions.

**1.5°C compatible pathway**[2]
($MtCO_2e$/year)




*Source: CAT 2019*

## Recent developments[3]

The German government has set up a sustainable finance advisory committee to assist the government in developing a sustainable finance strategy.

In January 2019, the German Coal Commission recommended a coal phase-out by 2035-2038, at the latest; the government aims to implement that recommendation.

The German government has officially given up on achieving its 2020 climate target.

## Key opportunities for enhancing climate ambition[3]

Neither Germany's current 2030 emission reduction target of -55%, nor a coal phase-out as late as 2035-2038, is in line with a 1.5°C pathway

→ **Adopt a climate change act with a more ambitious 2030 target and a coal phase-out by 2030.**

#1

Germany's government decided to introduce a modest $CO_2$ price in the transport and buildings sectors that raises up to 35 EUR/t in 2025, without much clarity about its future development

→ **Raise the price level and prolong a clear price signal beyond 2025.**

#2

Most financial actors in Germany do not sufficiently consider the impact of climate change in their investment decisions

→ **Introduce mandatory climate-related risks disclosure no later than December 2020.**

#3

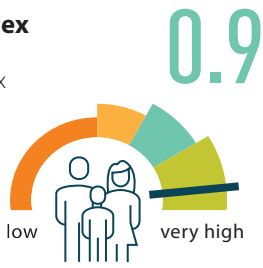
This country profile is part of the **Brown to Green 2019** report. The full report and other G20 country profiles can be downloaded at: *http://www.climate-transparency.org/g20-climate-performance/g20report2019*

# GERMANY – SOCIO-ECONOMIC CONTEXT

### Human Development Index

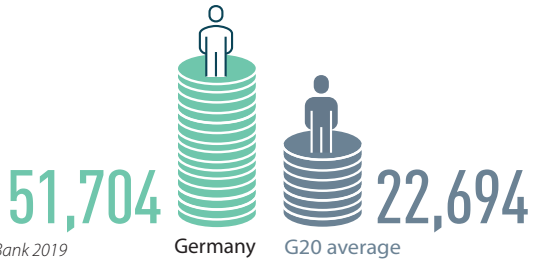
The Human Development Index reflects life expectancy, level of education, and per capita income. Germany ranks among the highest countries.

*Data for 2017 | Source: UNDP 2018*




### Gross Domestic Product (GDP) per capita

(PPP US$ const. 2018, international)



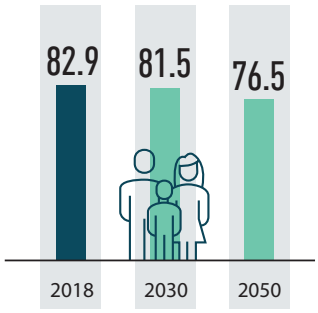

*Data for 2018 | Source: World Bank 2019*

### Population projections

(millions)

The World Bank expects Germany's population to decrease by about 8% by 2050.

*Source: World Bank 2019*




### Death through ambient air pollution

(total ambient air pollution attributable deaths)

Over 37,000 people die in Germany every year as a result of outdoor air pollution, due to stroke, heart disease, lung cancer and chronic respiratory diseases. Compared to the total population, this is one of the lower levels in the G20.

*Data for 2016*
*Source: World Health Organization 2018*



Ambient air pollution attributable death rate per 1,000 population per year, age standardised

# JUST TRANSITION[3]

In 2018, the government set up a multi-stakeholder commission called 'Growth, structural change and employment' (also called the Coal Commission) to assess the impact of a coal phase-out on energy security, emission reductions, and economic development in coal regions. In January 2019, the commission recommended a coal phase-out by 2038 at the latest, with an option to end earlier, in 2035, and an early closure of the oldest power stations. The commission recommended a EUR40bn (US$47bn) in aid to affected regions over the next 20 years.

The government has commited to follow the proposal and a law is expected in the coming months. There is, however, strong discontent among non-governmental organisations and citizens' initiatives, with claims that those affected by climate change worldwide and those forced to relocate due to lignite mining have not been sufficiently included in the 'just transition' debates and that the 2035-2038 horizon is not ambitious enough.

## Legend for all country profiles

### Trends

The trends show developments over the past five years for which data are available.

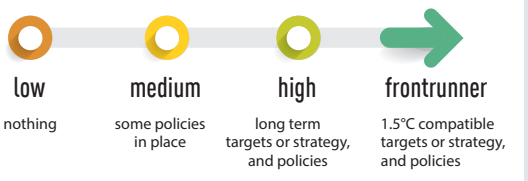
The thumbs indicate assessment from a climate protection perspective.

### Decarbonisation Ratings[4]

These ratings assess a country's performance compared to other G20 countries. A high scoring reflects a relatively good effort from a climate protection perspective but is not necessarily 1.5°C compatible.


### Policy Ratings[5]

The policy ratings evaluate a selection of policies that are essential pre-conditions for the longer-term transformation required to meet the 1.5°C limit.




For more information see the Annex and Technical Note

# MITIGATION BIG PICTURE

# GERMANY

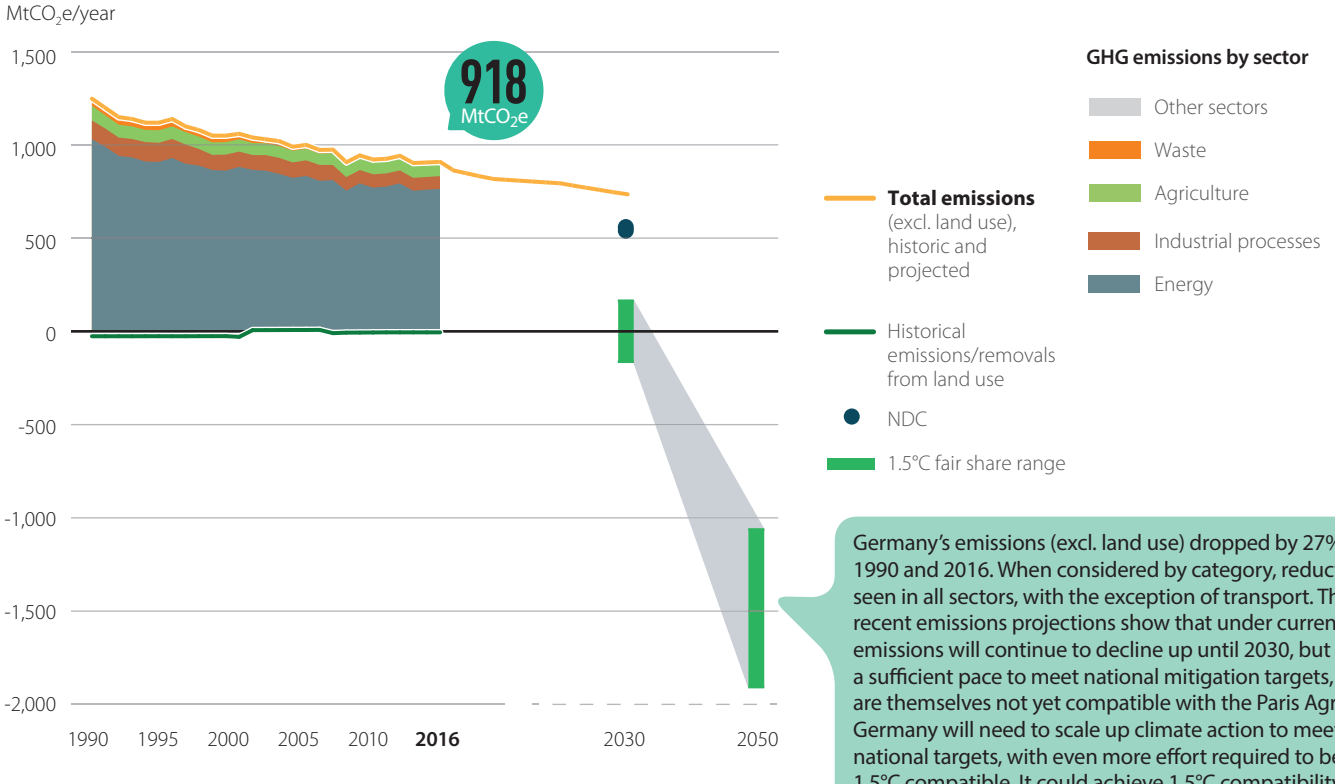
**Germany's GHG emissions have dropped by only 27% (1990-2016) and the government's climate targets for 2030 (-55%) and 2050 (-80-95%) are not in line with a 1.5°C pathway.**

In 2030, global GHG emissions need to be 45% below 2010 levels and reach net zero by 2070.

**1.5°C**[6]

*Source: IPCC SR1.5 2018*

## Total GHG emissions across sectors[2]




*Projections from policies implemented as of 2017.*
*Source: PRIMAP 2018; CAT 2019*

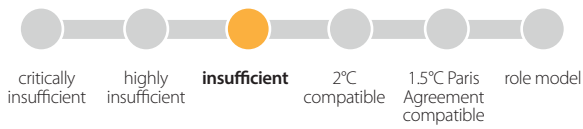
Germany's emissions (excl. land use) dropped by 27% between 1990 and 2016. When considered by category, reductions are seen in all sectors, with the exception of transport. The most recent emissions projections show that under current policies, emissions will continue to decline up until 2030, but not at a sufficient pace to meet national mitigation targets, which are themselves not yet compatible with the Paris Agreement. Germany will need to scale up climate action to meet its national targets, with even more effort required to become 1.5°C compatible. It could achieve 1.5°C compatibility via strong domestic emissions reductions. This could be supplemented with contributions to global emissions-reduction efforts.

## Nationally-determined contribution (NDC): Mitigation

| | |
|---|---|
| **Targets** | EU wide target: By 2030, at least 40% domestic GHG emissions reduction compared to 1990<br>National German 2030 target as part of the EU effort sharing of the NDC: at least -55% |
| **Actions** | Not mentioned |

*Source: UNFCCC, NDC of respective country*

## Climate action tracker (CAT) evaluation of NDC[2]




*Source: CAT 2019*

## Long-term strategy (LTS) to be submitted to the UNFCCC by 2020

| | |
|---|---|
| **Status** | Submitted to UNFCCC, last update in 2017 |
| **2050 target** | 80-95% reduction from 1990 levels, was lifted to, net zero' |
| **Interim steps** | Yes: at least -55% by 2030 and 70% by 2040 |
| **Sectoral targets** | Yes |

The government has agreed to 'net zero' GHG emissions as the new 2050 target.

*Source: UNFCCC, LTS of respective country*

# MITIGATION ENERGY

# GERMANY

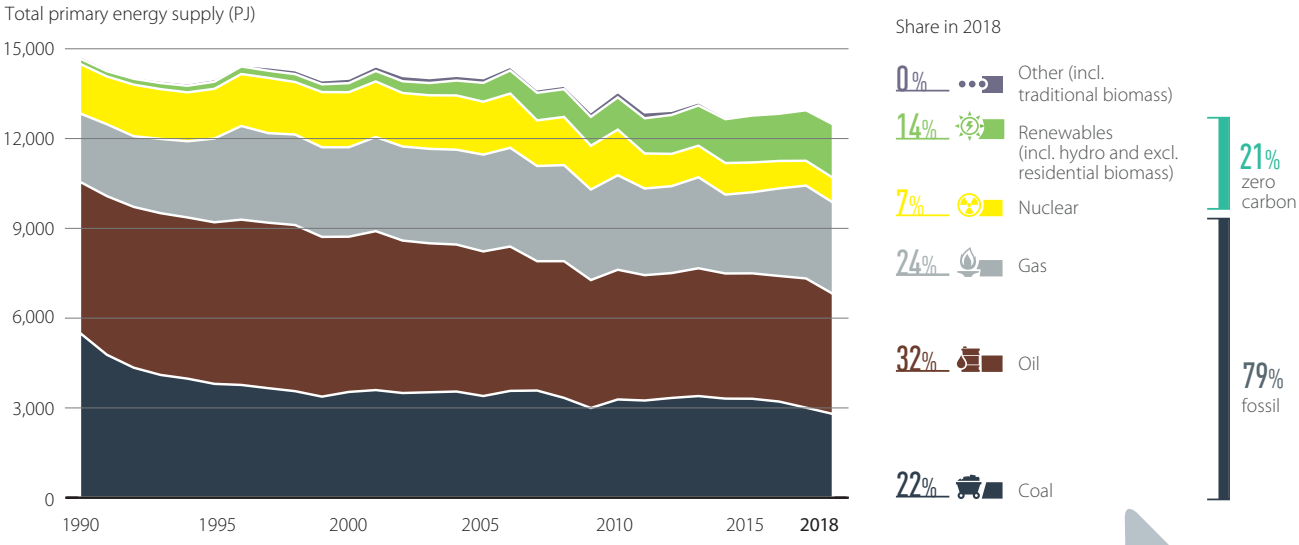
**Fossil fuels still make up 79% of Germany's energy mix (including power, heat, transport fuels, etc). Despite the increase in renewable energy over the last two decades, the carbon intensity of the energy mix has barely changed.**

The share of fossil fuels globally needs to fall to 67% of global total primary energy by 2030 and to 33% by 2050 and to substantially lower levels without Carbon Capture and Storage.

1.5°C[6]

*Source: IPCC SR1.5 2018*

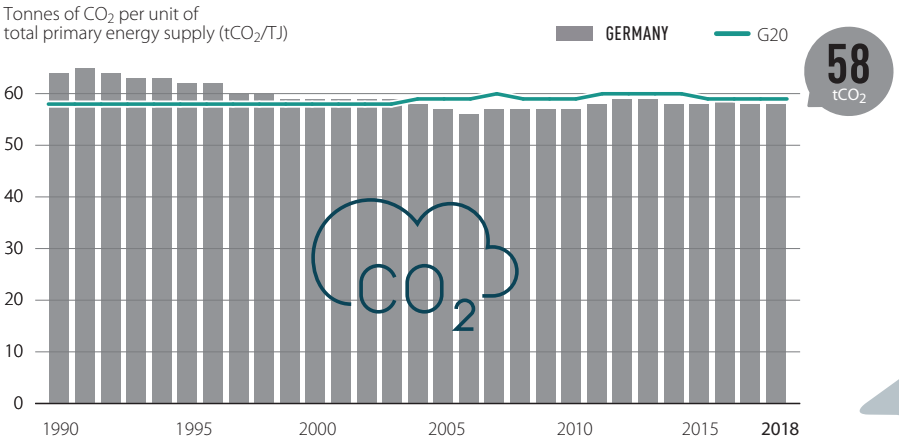
## Energy mix[7]




*Source: Enerdata 2019*

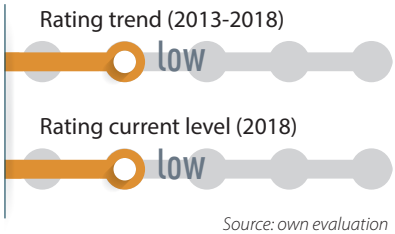
This graph shows the fuel mix for all energy supply, including energy used for electricity generation, heating, cooking, and transport fuels. Fossil fuels (oil, coal and gas) still make up 79% of the German energy mix, which is around the G20 average. The share of renewables in the energy mix has grown and has mainly replaced nuclear energy but increasingly also coal.

## Carbon intensity of the energy sector




*Source: Enerdata 2019*

### Rating of carbon intensity compared to other G20 countries[4]




*Source: own evaluation*

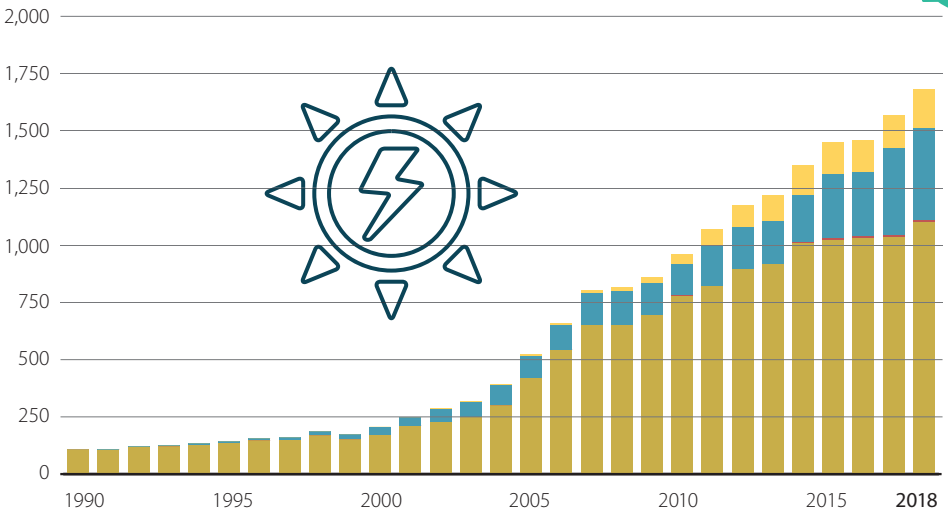
Carbon intensity shows how much $CO_2$ is emitted per unit of energy supply. In Germany, carbon intensity has remained almost constant at around 58 $tCO_2$ over the last five years and is around G20 average. This high level reflects the continuous high share of fossil fuels in the energy mix.

# MITIGATION ENERGY

# GERMANY

## Solar, wind, geothermal and biomass development[8]

Total primary energy supply (TPES) from solar, wind, geothermal and biomass (PJ)




*Source: Enerdata 2019*

13.4%

**Share of TPES in 2018**

1.34% Solar

3.21% Wind

0.06% Geothermal

8.81% Biomass, excl. traditional biomass

Solar, wind, geothermal and biomass account for 15% of Germany's energy supply – the G20 average is 9%. The share in total energy supply has increased in Germany from 11% in 2013 to 15% in 2018 (ie by around 34%). Bioenergy (for electricity, and biofuels for transportation and heat) makes up the largest share.

## Rating of share in TPES compared to other G20 countries[4]

Rating trend (2013-2018): high

Rating current level (2018): high

*Source: own evaluation*

## Energy supply per capita

Total primary energy supply per capita (GJ/capita)

150 Germany

98 G20 average

The level of energy supply per capita is closely related to economic development, climatic conditions and the price of energy.

At 150 GJ/capita, energy supply per capita in Germany is well above the G20 average, but is decreasing (-7%, 2013-2018) in contrast to the increasing G20 average (+1%).

**Trend** (2013-2018) -7% +1%

*Data for 2018 | Source: Enerdata 2019; World Bank 2019*

## Rating of energy supply per capita compared to other G20 countries[4]

Rating trend (2013-2018): high

Rating current level (2018): low

*Source: own evaluation*

# MITIGATION ENERGY

# GERMANY

**Germany is one of the least energy-intensive economies, but energy-related $CO_2$ emissions have barely declined and per capita energy supply is still high.**

Global energy and process-related $CO_2$ emissions must be cut by 40% below 2010 levels by 2030 and reach net zero by 2060.

**1.5°C**[6]

*Source: IPCC SR1.5 2018*

## Energy intensity of the economy

(TJ/PPP US$2015 million)

| Germany | G20 average |
|---|---|
| 3.31 | 4.86 |

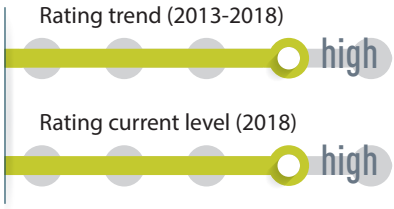
**Trend** (2013-2018): -12% | -12%

*Data for 2018 | Source: Enerdata 2019; World Bank 2019*

This indicator quantifies how much energy is used for each unit of GDP. This is closely related to the level of industrialisation, efficiency achievements, climatic conditions or geography.

Germany's energy intensity is one of the lowest in the G20 but is decreasing (-12%, 2013-2018) much like the G20 rate.

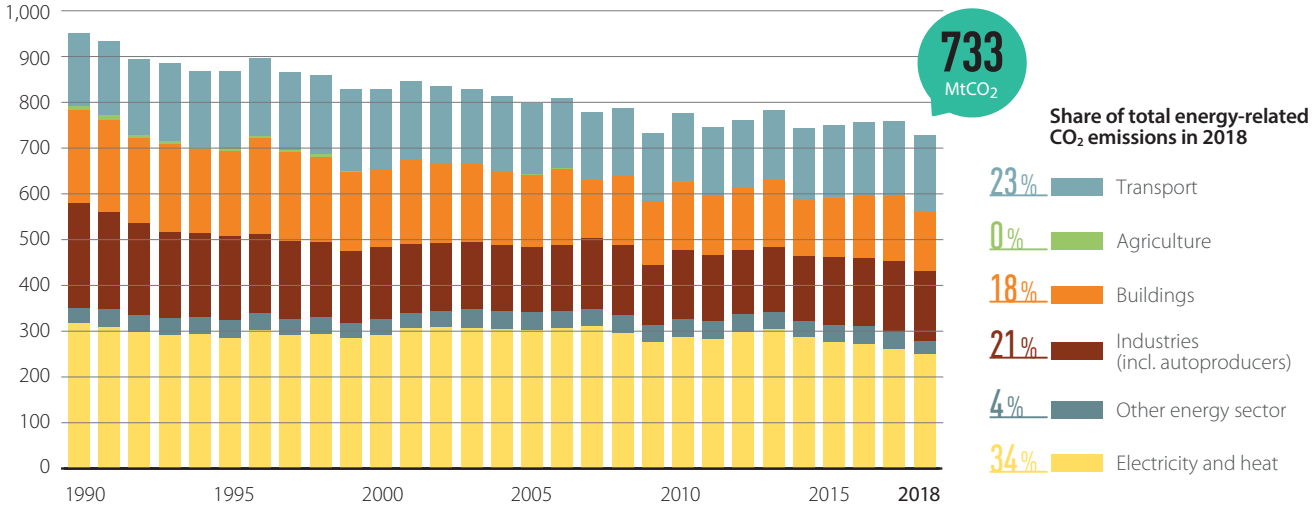
### Rating of energy intensity compared to other G20 countries[4]




*Source: own evaluation*

## Energy-related $CO_2$ emissions[9]

$CO_2$ emissions from fuel combustion ($MtCO_2$/year)




*Source: Enerdata 2019*

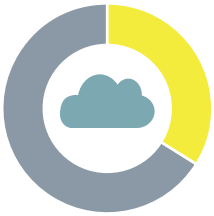
The largest driver of overall GHG emissions are $CO_2$ emissions from fuel combustion (84%). In Germany, they have remained almost stable over the last decade, with only minor ups and downs. The electricity sector (at 34%) is the largest contributor, followed by transport and industries, at 23% and 21% respectively.

# MITIGATION POWER SECTOR

# GERMANY

**! Germany still produces 37% of its electricity from coal. The decision to phase-out coal power by 2038 is not in line with a 1.5°C limit, given that Germany as an industrialised country needs to move faster.**

**Share in energy-related $CO_2$ emissions**




*Data for 2018 | Source: Enerdata 2019*

Coal must be phased out in the EU/OECD no later than 2030, in the rest of the world no later than 2040. Electricity generation needs to be decarbonised before 2050, with renewable energy the most promising option.[5]

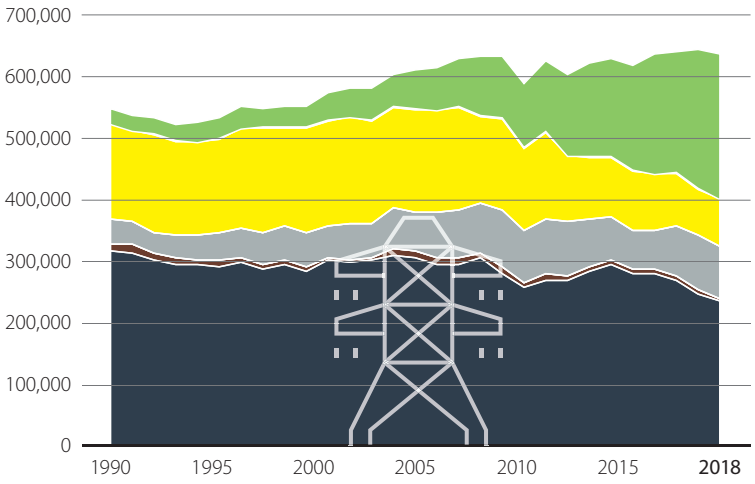
1.5°C[6]

*Source: IPCC SR1.5 2018; Climate Analytics 2016; Climate Analytics 2019*

## STATUS OF DECARBONISATION

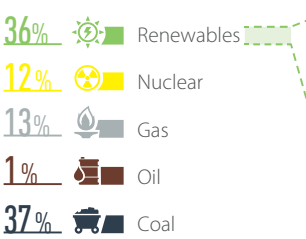
### Power mix

Gross power generation (TWh)

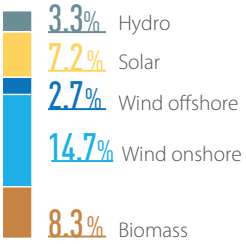



*Source: Enerdata 2019*

**Shares in 2018**

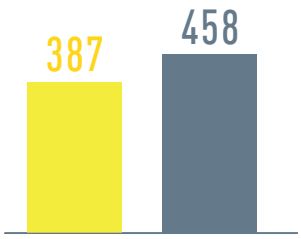



**Renewables shares**




Germany is increasingly producing power from renewables, accounting for more than a third of its power mix. Renewables have mainly replaced nuclear power, following Germany's nuclear phase-out decision. The level of coal power has started to decline in recent years but still accounts for 37% of the power mix.

**Emissions intensity of the power sector** ($gCO_2$/kWh)



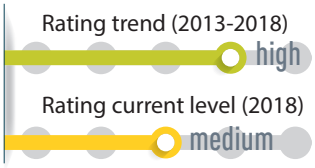

*Data for 2018 | Source: Enerdata 2019*

**Trend** (2013-2018)

-15% Germany

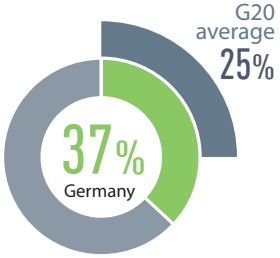
-11% G20 average

**Rating of emissions intensity compared to other G20 countries[4]**




*Source: own evaluation*

**Share of renewables in gross power generation** (incl. large hydro)



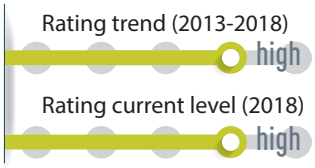

*Data for 2018 | Source: Enerdata 2019*

**Trend** (2013-2018)

+44% Germany

+20% G20 average

**Rating of share of renewables compared to other G20 countries[4]**




*Source: own evaluation*

For each kilowatt hour of electricity, 387 $gCO_2$ are emitted in Germany. This is slightly below the G20 average but still high. Emission intensity has dropped only marginally because the use of fossil fuels for power generation has barely dropped (still 51% of the power mix).

*Source: own evaluation*

# MITIGATION POWER SECTOR

# GERMANY

## POLICIES[5]

### Renewable energy in the power sector


Germany aims to increase the share of renewables in the power mix to 65% by 2030 and to at least 80% by 2050. Expansion of renewables has slowed down recently due to change of the support scheme, a cap on new installations, restrictive regulations in some federal states, and growing resistance against onshore wind.

*Source: own evaluation*

### Coal phase-out in the power sector

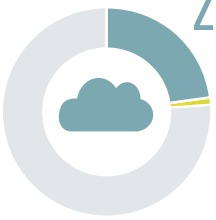

In January 2019, a multi-stakeholder commission recommended that around 25% of current coal capacity should be decommissioned by 2022, with a coal phase-out by 2035-2038 at the latest. The government is now working on respective legislation and financing frameworks.

*Source: own evaluation*

# MITIGATION TRANSPORT SECTOR

**Emissions from transport in Germany are on the rise: 84% of passenger transport is by private car, and 62% of freight transport is by road. Both sectors are still dominated by fossil fuels, and electric vehicles make up only 2% of car sales. In order to stay within a 1.5°C limit, a shift to more sustainable modes is required as well as decarbonisation of passenger and freight transport.**

### Share in energy-related $CO_2$ emissions




*Data for 2018 | Source: Enerdata 2019*

The proportion of low-carbon fuels in the transport fuel mix must increase to about 60% by 2050.

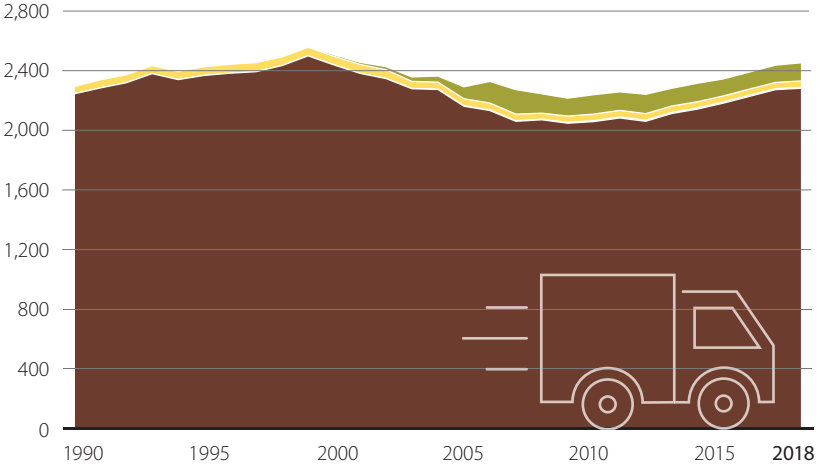
1.5°C[6]

*Source: IPCC SR1.5 2018*

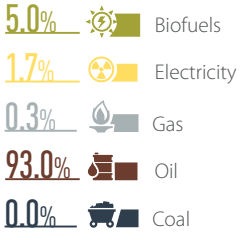
## STATUS OF DECARBONISATION

### Transport energy mix

Final energy consumption of transport by source (PJ/year), excl. aviation




**Share in 2018**




Electricity and biofuels make up only 7% of the energy mix in transport.

*Source: Enerdata 2019*

# MITIGATION TRANSPORT SECTOR

# GERMANY

## STATUS OF DECARBONISATION (continued)

### Transport emissions per capita[10]

($tCO_2$/capita, excl. aviation emissions)

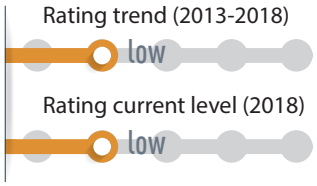

*Data for 2018*
*Source: Enerdata 2019; World Bank 2019*

**Trend** (2013-2018)

+6% Germany

+5% G20 average

**Rating of transport emissions compared to other G20 countries[4]**




*Source: own evaluation*

### Aviation emissions per capita[11]

($tCO_2$/capita)

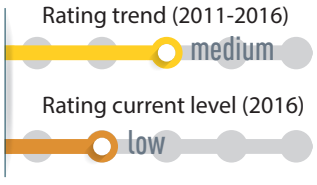

*Data for 2016*
*Source: Enerdata 2019; IEA 2018*

**Trend** (2011-2016)

+2% Germany

+10% G20 average

**Rating of aviation emissions compared to other G20 countries[4]**




*Source: own evaluation*

### Motorisation rate

(vehicles per 1,000 inhabitants)

685

*Data for 2016 | Source: Agora 2018*

### Market share of electric vehicles in new car sales

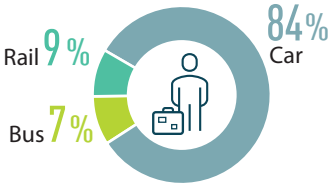
(%)

2.0%

*Data for 2018 | Source: IEA 2019*

### Passenger transport

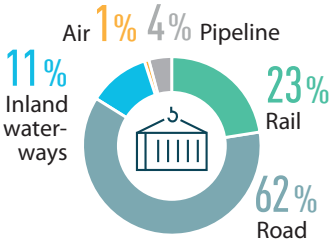
(modal split in % of passenger km)




*Data for 2016 | Source: Agora 2018*

### Freight transport

(modal split in % of tonne-km)




*Data for 2016 | Source: Agora 2018*

## POLICIES[5]

### Phase out fossil fuel cars


Germany set up a task force in 2019 to reduce emissions from transport. The government has not yet adopted a plan to phase-out fossil fuel cars but has set a target of 7-10 million electric vehicles by 2030 (150,000 at the end of 2018). $CO_2$ standards are set at EU level, with targets for 2025 and 2030.

⚠ Tax benefits for company cars incentivise vehicle use and higher fuel consumption.

*Source: own evaluation*

### Phase out fossil fuel heavy-duty vehicles


A transport task force is currently discussing solutions for reducing emissions from transport. Heavy-duty vehicles above 7.5t pay a toll on long-distance roads but the level still does not reflect all externalities. Germany is also piloting motorways with overhead power lines. $CO_2$ emission standards were introduced in 2019, with targets for 2025 and 2030.

*Source: own evaluation*

### Modal shift in (ground) transport


Germany is aiming to reduce emissions from transport by 40-42% from 1990 levels by 2030, according to the draft of the new climate act. The government agreed in its 2018 coalition agreement to double rail passenger numbers by 2030. The 2017 Masterplan for rail freight transport aims to increase rail capacity and promote digitalisation.

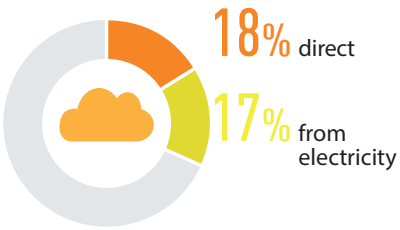
*Source: own evaluation*

# MITIGATION BUILDINGS SECTOR

# GERMANY

**Germany's building emissions – including heating, cooking and electricity use – make up a third of total $CO_2$ emissions. Per capita, building-related emissions are more than double the G20 average.**

### Share in energy-related $CO_2$ emissions




*Data for 2018 | Source: Enerdata 2019*

Global emissions from buildings need to be halved by 2030, and be about 80% below 2010 levels by 2050, achieved mostly through increased efficiency, reduced energy demand and electrification in conjunction with complete decarbonisation of the power sector.

**1.5°C**[6]

*Source: IEA ETP B2DS scenario assessed in IPCC SR1.5 2018*

## STATUS OF DECARBONISATION

### Building emissions per capita
(incl. indirect emissions)
($tCO_2$/capita)


-13% +0.5%

**Trend** (2013-2018)

*Data for 2018 | Source: Enerdata 2019; World Bank 2019*

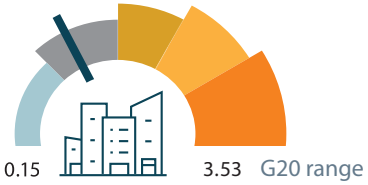
### Residential buildings: energy use per m²
(GJ)

**0.39 GJ**


*Data: year different per country | Source: ACEEE 2018*

### Commercial and public buildings: energy use per m²
(GJ)

**1.41 GJ**

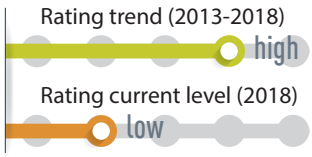



*Data: year different per country | Source: ACEEE 2018*

Building-related emissions per capita are more than double the G20 average. This reflects partly climatic conditions but also the high amount of floor area per person. In contrast to the G20 average, Germany has managed to reduce this level by 13% (2013-2018).

Building emissions are largely driven by how much energy is used in heating, cooling, lighting, household appliances, etc. In Germany, energy use per m² is in the middle range of G20 countries.

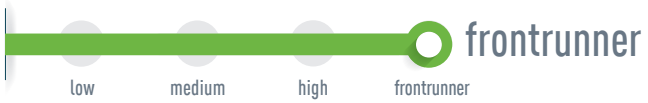
### Rating of building emissions compared to other G20 countries[4]




*Source: own evaluation*

## POLICIES[5]

### Near-zero energy new buildings




The 2015 Energy Efficiency Strategy provides a pathway for making the building stock virtually climate neutral by 2050. Germany plans to make all new buildings near-zero energy by 2020, and offers various support programmes to this end.

The measures included in Germany's 2019 climate package do not yet secure the achievment of the 2050 target.

*Source: own evaluation*

### Renovation of existing buildings


Germany's Climate Action Plan 2050 aims to make the entire building stock virtually climate-neutral by 2050 (80% energy reduction from 2008 levels). This would require at least doubling of current annual renovation rates (currently 1%). A renovation rate of 5% would be 1.5°C compatible.

The current annual renovation rate is only 1%.

*Source: own evaluation*

# MITIGATION INDUSTRY SECTOR

# GERMANY

**Industry-related emissions make up more than a third of $CO_2$ emissions in Germany. Germany has only managed to reduce emissions from this sector slightly.**

**Share in energy-related $CO_2$ emissions** (not including process emissions)

21 % direct

15 % from electricity

*Data for 2018 | Source: Enerdata 2019*

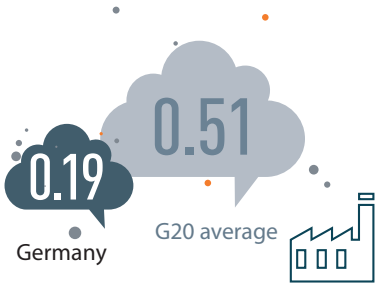
Global industrial $CO_2$ emissions need to be reduced by 65–90% from 2010 levels by 2050.

1.5°C[6]

*Source: IPCC SR1.5 2018*

## STATUS OF DECARBONISATION

**Industry emissions intensity**[12]
($tCO_2e$/US$2015 GVA)

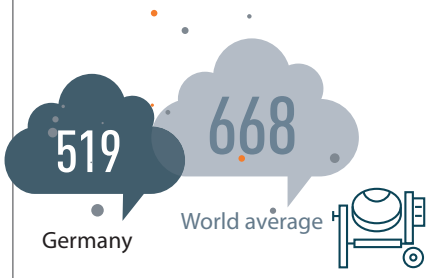



*Data for 2016 | Source: Enerdata 2019; PRIMAP 2018; World Bank 2019*

-8% -10%

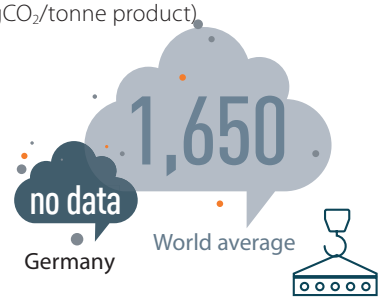
**Trend** (2011-2016)

**Carbon intensity of cement production**[13]
($kgCO_2$/tonne product)



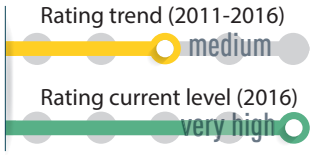

*Data for 2015 | Source: CAT 2019*

**Carbon intensity of steel production**[13]
($kgCO_2$/tonne product)




*Data for 2015 | Source: CAT 2019*

**Rating of emissions intensity compared to other G20 countries**[4]




*Source: own evaluation*

When comparing industrial emissions with the gross value added (GVA) from the industry sector, Germany performs comparatively well within the G20.

Steel production and steelmaking are significant GHG emission sources, and are challenging to decarbonise. Germany's cement industry is slightly less emission intensive than the world average.

## POLICIES[5]

**Energy efficiency**


Germany forms part of the EU Emissions Trading Scheme, and since 2015 obliges large companies to conduct energy audits. However, according to the International Energy Agency (IEA), less than 10% of industrial energy use was covered by mandatory energy efficiency policies in 2017. Germany favours the introduction of a minimum price for EU ETS allowances.

*Source: own evaluation*

# MITIGATION LAND USE

# GERMANY

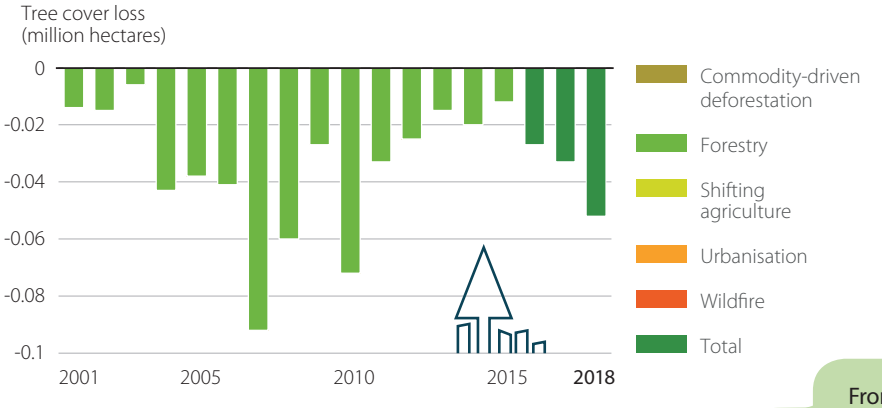
**In order to stay within the 1.5°C limit, Germany needs to make the land use and forest sector a net sink of emissions, eg by halting the expansion of residential areas, discontinuing the degradation of peatlands and use of moor soils, converting cropland into wetlands, and planting new forests.**

Global deforestation needs to be halted and changed to net $CO_2$ removals by around 2030.

1.5°C[6]

*Source: IPCC SR1.5 2018*

### Gross tree cover loss by dominant driver[14]




*Source: Global Forest Watch 2019*
*Note: 2000 tree cover extent | >30% tree canopy | these estimates do not take tree cover gain into account*

## POLICIES[5]

### (Net) zero deforestation


According to its 2050 Climate Plan, Germany aims to increase its forest area over the next few decades and reduce the expansion of settlements and transport infrastructure to zero hectares by 2050.

*Source: own evaluation*

From 2001 to 2018, Germany lost 646kha of tree cover, equivalent to a **5.2% reduction since 2000**. This does not take tree-cover gain into account.

# MITIGATION AGRICULTURE

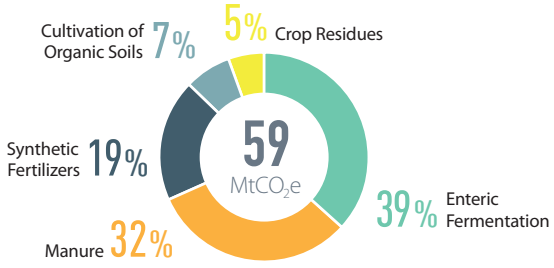
**Germany's agricultural emissions come mainly from digestive processes in animals, livestock manure, and the use of synthetic fertilizers. A 1.5°C pathway requires dietary shifts, increased organic farming, and less fertilizer use.**

Global methane emissions (mainly enteric fermentation) need to decline by 10% by 2030 and by 35% by 2050 (from 2010 levels). Nitrous oxide emissions (mainly from fertilzers and manure) need to be reduced by 10% by 2030 and by 20% by 2050.

1.5°C[6]

*Source: IPCC SR1.5 2018*

### GHG emissions from agriculture (not including energy)




*Data for 2016 | Source: FAOSTAT 2019*

In Germany, the largest sources of GHG emissions in the agricultural sector are digestive processes in animals (enteric fermentation), livestock manure, and the use of synthetic fertilizers. A shift to an agricultural policy that is less oriented towards mass production could help reduce emissions - with a shift to organic farming, reduction of animal numbers, more efficient us of manure and synthetic fertilizers, and diet changes. Imports of animal feedstuff drive deforestation abroad, especially in the Amazonian region. However, the resulting GHG emissions are not counted in the German national agricultural emissions according to IPCC methodologies.

# ADAPTATION

# GERMANY

- → **Germany is vulnerable to climate change and adaptation actions are needed.**
- → **On average, 475 fatalities and losses amounting to almost US$4 billion occur yearly due to extreme weather events.**
- → **With global warming, society and its supporting sectors are increasingly exposed to severe events and impacts, such as droughts and reduction in crop duration in the agricultural sector.**

## ADAPTATION POLICIES

**Nationally-determined contribution: Adaptation**

| | |
|---|---|
| **Targets** | Not mentioned |
| **Actions** | Not mentioned |

*Source: UNFCCC, NDC of respective country*

**National adaptation strategies**

| Document name | Publication year | Fields of action (sectors) | | | | | | | | | | | | | M&E process (reporting frequency) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Agriculture | Biodiversity | Coastal areas & fishing | Education & research | Energy & industry | Finance & insurance | Forestry | Health | Infrastructure | Tourism | Transport | Urbanism | Water | |
| German Strategy for Adaptation to Climate Change (DAS) | 2008 | | x | x | | x | x | x | x | x | x | x | | x | n/a |
| Adaptation Action Plan APA I | 2011 | n/a | | | | | | | | | | | | | Updated every 5 years in the form of progress reports |
| Progress report to the DAS | 2015 | x | x | | | | x | | x | x | | | x | x | n/a |

*Source: own research*

# GERMANY

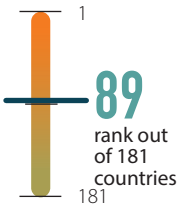
## ADAPTATION NEEDS

### Climate Risk Index for 1998-2017

Impacts of extreme weather events in terms of fatalities and economic losses that occured

### Global Climate Risk Index 2019 | All numbers are averages (1998-2017)

| Weather-related fatalities | Per 100,000 inhabitants | Annual average losses (PPP US$ mn) | Per unit GDP (%) |
|---|---|---|---|
| 475 | 0.58 | 3,946 | 0.12 |


*Source: Germanwatch 2018*

Germany has already been struck by extreme weather events such as storms, heat waves, fires and floods. As highlighted by the numbers from the Climate Risk Index, such extreme weather events result in fatalities and economic losses. Climate change is expected to worsen the intensity, frequency and impacts of such events.

### Exposure to future impacts at 1.5°C, 2°C and 3°C

| | | 1.5°C | 2°C | 3°C |
|---|---|---|---|---|
| **Water** | % of area with increase in water scarcity | | | |
| | % of time in drought conditions | | | |
| **Heat & Health** | Heatwave frequency | | | |
| | Days above 35°C | | | |

*Source: own research*

| | | | 1.5°C | 2°C | 3°C |
|---|---|---|---|---|---|
| **Agriculture** | Maize | Reduction in crop duration | | | |
| | | Hot spell frequency | | | |
| | | Reduction in rainfall | | | |
| | Wheat | Reduction in crop duration | | | |
| | | Hot spell frequency | | | |
| | | Reduction in rainfall | | | |

*Source: Based on Arnell et al 2019*

Overall, with rising temperatures, all sectors are adversely affected. In the water sector, water scarcity and time spent in drought conditions drastically increase. Heat wave frequency increases significantly, together with an increase in the number of days with temperatures above 35°C.

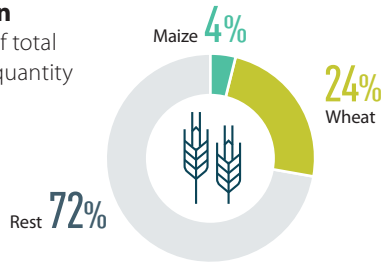
### Impact ranking scale

- Very low
- Low
- Medium
- High
- Very high

Blank cells signify that there is no data available

### National crop production

(share in % of total production quantity in tonnes)




*Data for 2017 | Source: FAOSTAT 2019*

Wheat and maize represent the largest proportions of crop production out of the four crops analysed (maize, rice, soybeans, wheat). There are drastic reductions in crop duration for both crops; and an increase (for wheat only slight) in hot spell frequency. Wheat is affected by reduced rainfall, whereas maize production sees a slight increase.

# FINANCE

# GERMANY

**Germany's fossil fuel subsidies totalled US$ 5.4 billion in 2017**

Investment into green energy and infrastructure needs to outweigh fossil fuel investments by 2025.

1.5°C[6]

*Source: IPCC SR1.5 2018*

## Nationally-determined contribution: Finance

| | |
|---|---|
| **Conditionality** | Not applicable |
| **Investment needs** | Not specified |
| **Actions** | Not mentioned |
| **International market mechanisms** | No contribution from international credits for the achievement of the target |

*Source: UNFCCC, NDC of respective country*

## Financial policy and regulation supporting a brown to green transition

Through policy and regulation governments can overcome challenges to mobilising green finance, including: real and perceived risks, insufficient returns on investment, capacity and information gaps.

| Category | Instruments | Objective | Under discussion/ implementation | Not identified |
|---|---|---|---|---|
| **Green Financial Principles** | N/A | This indicates political will and awareness of climate change impacts, showing where there is a general discussion about the need for aligning prudential and climate change objectives in the national financial architecture. | **X** | |

| | | | Mandatory | Voluntary | Under discussion | Not identified |
|---|---|---|---|---|---|---|
| **Enhanced supervisory review, risk disclosure and market discipline** | Climate risk disclosure requirements | Disclose the climate-related risks to which financial institutions are exposed | | | **X** | |
| | Climate-related risk assessment and climate stress-test | Evaluate the resilience of the financial sector to climate shocks | | | **X** | |
| **Enhanced capital and liquidity requirements** | Liquidity instruments | Mitigate and prevent market illiquidity and maturity mismatch | | | | **X** |
| | Lending limits | Limit the concentration of carbon-intensive exposures | | | | **X** |
| | | Incentivise low carbon-intensive exposures | | | | **X** |
| | Differentiated Reserve Requirements | Limit misaligned incentives and canalise credit to green sectors | | | | **X** |

*Source: own research*

Deutsche Bundesbank is a founding member of the Network for Greening the Financial System (NGFS), and has endorsed the principles of the Task-Force of Climate Related Financial Disclosure, while Deutsche Börse launched its Accelerating Sustainable Finance Initiative in 2017, setting out voluntary guidelines for sustainable finance. Much of Germany's green financial policy and regulation has taken place at subnational level. The federal state of Berlin introduced a sustainability index in 2017 to reallocate pension fund investments, while the state of Hesse plans to make Frankfurt a green finance hub. The Federal Ministry of Finance's 2019 Annual Economic Report highlighted that "the impact of climate change on financial stability… needs to be considered". In 2019, the government launched a sustainable finance advisory committee to assist in the development of a national sustainable finance strategy. The aim is to make Germany a leading centre for sustainable finance.

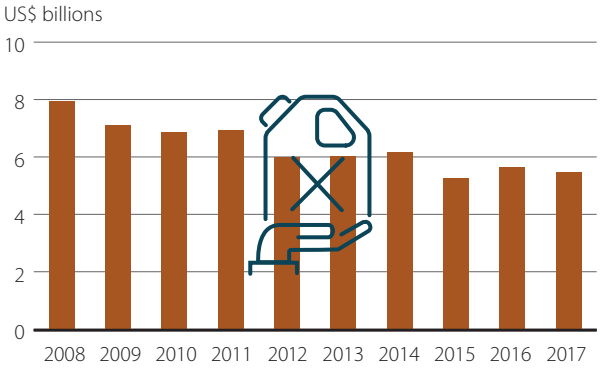
# FINANCE

# GERMANY

## Fiscal policy levers

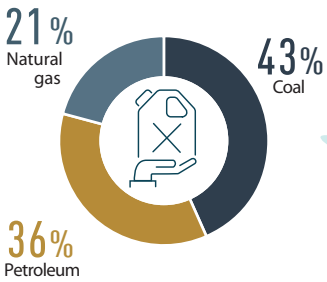
**Fiscal policy levers raise public revenues and direct public resources. Critically, they can shift investment decisions and consumer behaviour towards low-carbon, climate-resilient activities by reflecting externalities in prices.**

### Fossil fuel subsidies




*Source: OECD-IEA 2019*

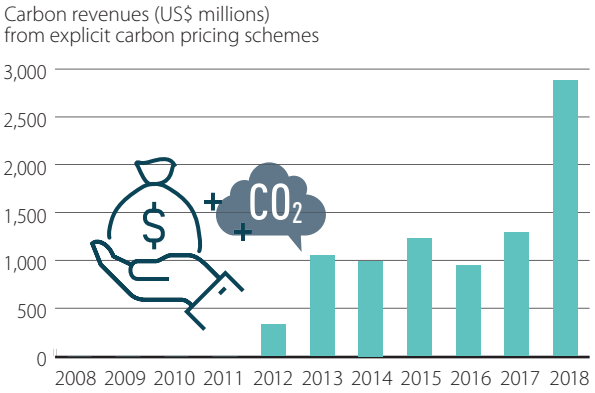
### Subsidies by fuel type




In 2017, Germany's fossil fuel subsidies totalled US$5.4bn (gradually declining since last decade's peak of US$7.9bn in 2008). Of the subsidies identified, 53% were for the consumption of fossil fuels, and 47% for their production. The highest subsidies identified were for coal (mostly for transition away from coal), at US$2.4bn, followed by natural gas at US$2bn. The highest subsidy was for the combined aid package to the hard coal industry in North Rhine Westphalia.

*Data for 2017 | Source: OECD-IEA 2019*

### Carbon revenues

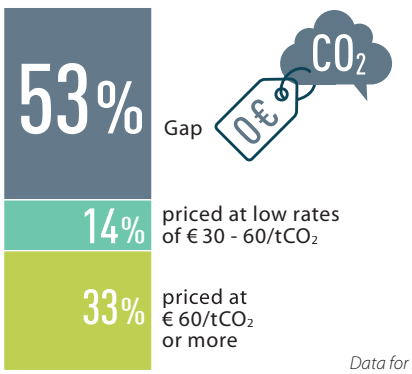



*Source: I4CE 2019*

In 2019, the German government announced to establish an explicit carbon price in the transport and heating sectors on a national level, starting from 2021, and with a view to coordinate $CO_2$ pricing with other European countries. Around half of Germany's emissions are covered under the EU Emissions Trading Scheme, which generated US$2.9bn of revenues in 2018 in Germany alone.

### Carbon pricing gap[15]

% of energy-related $CO_2$ emissions




*Data for 2015 | Source: OECD 2018*

'Effective carbon rates' are the total price that applies to $CO_2$ emissions, and are made up of carbon taxes, specific taxes on energy use and the price of tradable emission permits. In Germany, 47% of $CO_2$ emissions are priced at an effective carbon rate of EUR30 or higher (the low-end benchmark), creating a carbon pricing gap of 53%. This gap is lower than the G20 average of 71%. The price covers not only explicit carbon taxes but also specific taxes on energy use and the price of tradable emission permits.

# FINANCE

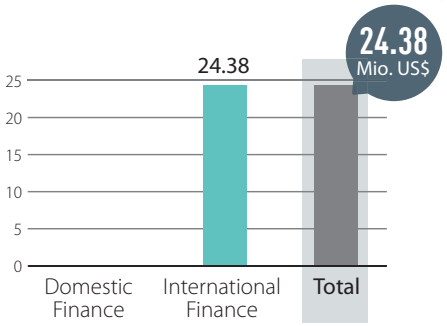
# GERMANY

## Public finance

**Governments steer investments through their public finance institutions including via development banks, both at home and overseas, and green investment banks. Developed G20 countries also have an obligation to provide finance to developing countries and public sources are a key aspect of these obligations under the UNFCCC.**

### Public finance for coal[16]

(million US$)




In 2017, Germany's public finance institution Kreditanstalt fuer Wiederaufbau (KfW) provided a $48.8 million loan for a coal-fired power plant in Serbia.

- Domestic Finance
- International Finance

*Data year: 2016-2017 average*
*Source: Oil Change International 2019*

### Commitments to restrict public finance to coal and coal-fired power[17]

| MDB level | National development agencies and banks | Domestic export credit agencies | Export credit restriction in OECD | Comment |
|---|---|---|---|---|
| X | X | – | X | Since 2019, the KfW generally excludes finance for coal infrastructure in direct project finance but not for financial intermediary lending. However, a broad range of exemptions are available. |

X yes – no not applicable

*Source: own research*

## Provision of international public support[18]

Germany provided the third largest amount of climate finance bilaterally and through multilateral climate funds, in absolute terms. Germany's reporting of bilateral finance includes $5.47 billion 'mobilised through KFW' in 2015/2016, but is excluded here to make its contribution comparable to other G20 countries. Since the 2013/14 period, both bilateral and multilateral flows have remained relatively consistent. In 2019, Germany (alongside Norway) led the way in first announcing intent to double their original contributions to the Green Climate Fund during its first replenishment, amounting to EUR 1.5 billion.

**Obligation to provide climate finance under UNFCCC**

YES NO

United Nations Framework Convention on Climate Change

**Bilateral climate finance contributions**

| Annual average contribution (mn US$, 2015-2016) | Theme of support | | | |
|---|---|---|---|---|
| | Mitigation | Adaptation | Cross-cutting | Other |
| 2,845.29 | 62% | 11% | 7% | 20% |

*Source: Country reporting to UNFCCC*

**Multilateral climate finance contributions**

*See Technical Note for multilateral climate funds included and method to attribute amounts to countries*

| Annual average contribution (mn US$, 2015-2016) | Theme of support | | |
|---|---|---|---|
| | Adaptation | Mitigation | Cross-cutting |
| 188.86 | 28% | 58% | 14% |

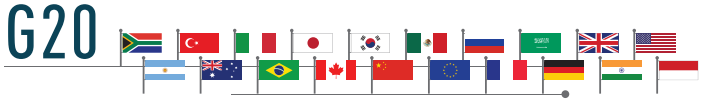
*Source: Country reporting to UNFCCC*

**Core/General Contributions**

| Annual average contribution (mn US$, 2015-2016) |
|---|
| 932.21 |

*Source: Country reporting to UNFCCC*

# ENDNOTES




1) 'Land use' emissions is used here to refer to land-use, land use change and forestry (LULUCF). The Climate Action Tracker (CAT) derives historical LULUCF emissions from the UNFCCC Common Reporting Format (CRF) reporting tables data converted to the categories from the IPCC 1996 guidelines, in particular separating Agriculture from Land use, land-use change and forestry (LULUCF), which under the new IPCC 2006 Guidelines is integrated into Agriculture, Forestry, and Other Land Use (AFOLU).

2) The 1.5°C fair share ranges for 2030 and 2050 are drawn from the CAT, which compiles a wide range of perspectives on what is considered fair, including considerations such as responsibility, capability, and equality. Countries with 1.5°C fair-share ranges reaching below zero, particularly between 2030 and 2050, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by contributions to global emissions-reduction efforts via, for example, international finance. On a global scale, negative emission technologies are expected to play a role from the 2030s onwards, compensating for remaining positive emissions.

   The CAT's evaluation of NDCs shows the resulting temperature outcomes if all other governments were to put forward emissions reduction commitments with the same relative ambition level.

   The 2030 projections of GHG emissions are from the CAT's June 2019 update and are based on implemented policies, expected economic growth or trends in activity and energy consumption.

   The CAT methodology does not consider GHG emissions from LULUCF due to the large degree of uncertainty inherent in this type of data, and alsoto ensure consistency and comparability across countries.

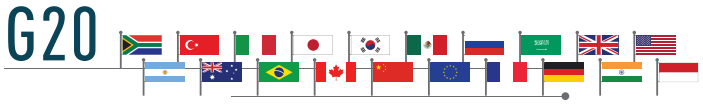
3) See the Brown to Green 2019 Technical Note for the sources used for this assessment.

4) The Decarbonisation Ratings assess the relative performance across the G20. A high scoring reflects a relatively good efforts from a climate protection perspective but is not necessarily 1.5°C compatible. The ratings assess both the 'current level' and 'recent developments' to take account of the different starting points of different G20 countries. The 'recent developments' ratings compare developments over the last five available years (often 2013 to 2018).

5) The selection of policies rated and the assessment of 1.5°C compatibility are informed by the Paris Agreement, the Special Report on 1.5°C of the International Panel on Climate Change (2018), and the Climate Action Tracker (2016): 'The ten most important short-term steps to limit warming to 1.5°C'. The table below displays the criteria used to assess a country's policy performance. See the Brown to Green Report 2019 Technical Note for the sources used for this assessment.

| On endnote 5) | low | medium | high | frontrunner |
|---|---|---|---|---|
| **Renewable energy in power sector** | No policy to increase the share of renewables | Some policies | Policies and longer-term strategy/ target to significantly increase the share of renewables | Short-term policies + long-term strategy for 100% renewables in the power sector by 2050 in place |
| **Coal phase-out in power sector** | No target or policy in place for reducing coal | Some policies | Policies + coal phase-out decided | Policies + coal phase-out date before 2030 (OECD and EU28) or 2040 (rest of the world) |
| **Phase out fossil fuel cars** | No policy for reducing emissions from light-duty vehicles | Some policies (e.g. energy/ emissions performance standards or bonus/malus support) | Policies + national target to phase out fossil fuel light-duty vehicles | Policies + ban on new fossil-based light-duty vehicles by 2035 worldwide |
| **Phase out fossil fuel heavy-duty vehicles** | No policy | Some policies (e.g. energy/ emissions performance standards or support) | Policies + strategy to reduce absolute emissions from freight transport | Policies + innovation strategy to phase out emissions from freight transport by 2050 |
| **Modal shift in (ground) transport** | No policies | Some policies (e.g. support programmes to shift to rail or non-motorised transport) | Policies+ longer-term strategy | Policies + longer-term strategy consistent with 1.5°C pathway |
| **Near zero-energy new buildings** | No policies | Some policies (e.g. building codes, standards or fiscal/ financial incentives for low-emissions options) | Policies + national strategy for near zero-energy new buildings | Policies + national strategy for all new buildings to be near zero-energy by 2020 (OECD countries) or 2025 (non-OECD countries) |
| **Retrofitting existing buildings** | No policies | Some policies (e.g. building codes, standards or fiscal/ financial incentives for low-emissions options) | Policies + retrofitting strategy | Policies + strategy to achieve deep renovation rates of 5% annually (OECD) or 3% (non-OECD) by 2020 |
| **Energy efficiency in industry** | No policies | Mandatory energy efficiency policies cover more than 26-50% of industrial energy use | Mandatory energy efficiency policies cover 51–100% of industrial energy use | Policies + strategy to reduce industrial emissions by 75%–90% from 2010 levels by 2050 |
| **(Net) zero deforestation** | No policy or incentive to reduce deforestation in place | Some policies (e.g. incentives to reduce deforestation or support schemes for afforestation /reforestation in place) | Policies + national target for reaching net zero deforestation | Policies + national target for reaching zero deforestation by 2020s or for increasing forest coverage |

# ENDNOTES (continued)




6) The 1.5°C benchmarks are based on the Special Report on 1.5°C of the International Panel on Climate Change (2018). See the Brown to Green 2019 Technical Note for the specific sources used for this assessment.
7) Total primary energy supply data displayed in this Country Profile does not include non-energy use values. Solid fuel biomass in residential use has negative environmental and social impacts and is shown in the category 'other'.
8) Large hydropower and solid fuel biomass in residential use are not reflected due to their negative environmental and social impacts.
9) The category 'electricity and heat' covers $CO_2$ emissions from power generation and from waste heat generated in the power sector. The category 'other energy use' covers energy-related $CO_2$ emissions from extracting and processing fossil fuels (e.g. drying lignite).
10) This indicator shows transport emissions per capita, not including aviation emissions.
11) This indicator adds up emissions from domestic aviation and emissions from international aviation bunkers in the respective country. Emissions by aircrafts in the higher atmosphere lead to a contribution to climate change greater than emissions from burning fossil fuels. In this Country Profile, however, only a radiative forcing factor of 1 is assumed.
12) This indicator includes only direct energy-related emissions and process emissions (Scope 1) but not indirect emissions from electricity.
13) This indicator includes emissions from electricity (Scope 2) as well as direct energy-related emissions and process emissions (Scope 1).
14) This indicator covers only gross tree-cover loss and does not take tree-cover gain into account. It is thus not possible to deduce from this indicator the climate impact of the forest sector. The definition of 'forest' used for this indicator is also not identical with the definition used for the indicator on page 3.
15) 'Effective carbon rates' are the total price that applies to $CO_2$ emissions, and are made up of carbon taxes, specific taxes on energy use and the price of tradable emission permits. The carbon pricing gap is based on 2015 energy taxes and is therefore likely to be an underestimate, as taxation has tended to increase in countries over time.
16) The database used to estimate public finance for coal is a bottom-up database, based on information that is accessible through various online sources, and is therefore incomplete. For more information, see to the Brown to Green 2019 Technical Note.
17) See the Brown to Green 2019 Technical Note for the sources used for this assessment.
18) Climate finance contributions are sourced from Biennial Party reporting to the UNFCCC. Refer to the Brown to Green Report 2019 Technical Note for more detail.

For more detail on the sources and methodologies behind the calculation of the indicators displayed, please download the Technical Note at: http://www.climate-transparency.org/g20-climate-performance/g20report2019

# CLIMATE TRANSPARENCY

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